

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improvements in or relating to Circlip Holders

We, ANDERTON SPRINGS LIMITED, of 28, Clyde Street, Bingley, in the County of York, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to circlip holders to facilitate their supply to what may be termed a delivery or required point, say in automatic or semi-automatic apparatus, or for quick handling.

It is known to feed circlips from holders adapted to facilitate the delivery of circlips for use so as to speed up assembly and other operations. It will be appreciated that circlips must be delivered from the holder to the work-piece individually.

It has previously been proposed to construct circlip holders by providing a flat bar of strip metal which passes through the interior of each circlip in a stack and thereby holds them temporarily in position on the holder. These holders, however, suffer from the disadvantage that they are only capable of retaining circlips of a particular internal shape in which recesses are formed into which the flat bar or strip may be located. These recesses in other circlips are substantially semi-circular and therefore these cannot be retained. Also, if the circlips are not presented to the delivery point in the correct position, which may result if a flat bar or strip is employed, removal from the holder may be difficult.

The main object of this invention is to provide a circlip holder which overcomes the above disadvantages.

Accordingly there is provided a circlip holder, comprising a bar, tube or equivalent element on which circlips may be mounted for free sliding movement along the element, said element having part adapted to engage the internal surface of a circlip to hold same on the element and also part which lies within the jaws of the circlip to prevent rotation

thereof relative to the element, and spring or other retaining means to fit on to said element. The circlips may be substantially C-shaped with inner integral spring jaws extending inwardly from the inlet opening of each clip, or of open C-shape, U-shape, E-shape or the like.

Referring to the accompanying drawings in which various embodiments of the invention are shown:—

Fig. 1 is a perspective view of circlips on a carrier element;

Fig. 2 is an enlarged sectional view on line A—A of Fig. 1;

Fig. 3 is a perspective view of a loaded carrier element retained in a feeder base;

Fig. 4 is an enlarged perspective detail view of the feeder base with a carrier element about to be inserted; and

Figs. 5 to 7 are respectively enlarged part sectional plan views of other different forms of circlips and carrier elements.

In a particular embodiment of this invention shown in Figs. 1 and 2, a mounting element in the form of a bar 1 is provided for the loading of circlips 2 of a substantially elongated C-shape with an inner part-circular opening 3 and a gap between the spring jaws 5. The inner surfaces of the jaws 5 bounding the gap 4 are parallel and then extend outwardly to form opening 6. The element 1 is made of keyhole cross-sectional shape so that part thereof of circular cross-section engages the internal surface of a circlip to hold same on the element, and part lies in gap 4 i.e., lies within the jaws 5 so that circlips can be slid on from one end to be freely slidable thereon and held against rotation by jaws 5 engaging that part of the element between them. For storage and transit and mounting purposes the circlips are held on the element in any convenient manner such as by the provision of a small spring clip 7, of corrugated wire formation, and a spring ring 8. It will be appreciated that bars may be made

of any required length according to the number of circlips to be mounted thereon.

The circlip loaded holder may readily be mounted in or on what may be termed supply apparatus and be held, say at one or both of its ends, so that the mounting element is in a vertical plane. With the element so mounted the lower spring retaining circlip 7 can be removed for the stack of loose circlips to fall into the desired position so that they may be removed successively by say a hand tool. Alternatively, the circlips may be removed by separating or feeding means.

Conveniently the circlips fall by gravity to be removed at reduced end 9 of the element as separate successive units. The said element is reduced at the end 9 to a rectangular cross section to enable the circlips to be removed laterally of the element and such end may be fitted into a location hole in a mounting device. If desired both ends of the element may be reduced. A suitable mounting device for the element 1 is shown in Figs. 3 and 4 and comprises a base 10 having a small platform 11 and associated upstanding distance piece 12 which may be removable from the base. The platform provides a socket hole 13 for the end 9 of the element 1, which is pushed into the socket hole and the piece 12 or a separate gauge is used to decide the amount of clearance, to suit the thickness of the circlips on the element 1, between the shoulder 14 and the platform 11 for the radial withdrawal of single circlips. The element when positioned is secured by the screw 15. To facilitate the use of a single base for the removal of circlips of different thicknesses the base can be provided, as shown in Fig. 4 with feeler gauges 16 which can be swung over the platform for the clearance setting of an element.

In a modification the mounting element is of T-cross-sectional shape, C-shape or other shape which has part which engages the internal surface of a circlip and also part which lies within the jaws thereof to prevent rotation. Any of these elements may be solid or hollow.

For example, Fig. 5 shows a T-section element 1a with a reduced end 9 and holding a C-shaped clip 2a with a back stop 17. Fig. 6 shows an element 1 with a further type of C-shaped clip 2b having inner integral semi-circular spring jaws 18. Fig. 7 shows a tubular

element 1b of substantially keyhole section with a reduced end 9 which may be formed by flattening the tube or by the use of an end plug with flats, the split pin 19 forming a retainer for circlips 2c of common C-shape.

#### WHAT WE CLAIM IS:—

1. A circlip holder, comprising a bar, tube or equivalent element on which circlips may be mounted for free sliding movement along the element, said element having part adapted to engage the internal surface of a circlip to hold same on the element and also part which lies within the jaws of the circlip to prevent rotation thereof relative to the element, and spring or other retaining means to fit on to said element.

2. A circlip holder as claimed in Claim 1, wherein said element is of either keyhole or T-section.

3. A circlip holder as claimed in either Claim 1 or Claim 2, wherein said element has at least one end reduced to allow the withdrawal of circlips laterally of the element.

4. A circlip holder as claimed in Claim 3 in combination with a mounting device having a socket for reception of the reduced end of the element and in which said mounting device provides a stop face on which circlips will rest in turn, said element allowing circlips to be withdrawn from the reduced end thereof.

5. The combination as claimed in Claim 4, wherein the end of the circlip retaining part of the carrier element is spaced from the stop face of the mounting device to give sufficient clearance for circlips to be withdrawn singly in succession, and gauge means for the easy setting of said clearance.

6. The combination as claimed in Claim 5, wherein the gauge means comprises a number of feeler gauges to be used singly or in combination for facilitating variation in the setting, said gauges being movably mounted on the mounting device.

7. A circlip holder substantially as herein described and as illustrated in any one of Figs. 2, 5, 6 or 7 of the accompanying drawing.

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#### PROVISIONAL SPECIFICATION

#### Improvements in or relating to Circlip Holders

We, ANDERTON SPRINGS LIMITED, of 28, Clyde Street, Bingley, in the County of York, a British Company, do hereby declare this invention to be described in the following statement:—

This invention relates to the positioning of circlips to facilitate their supply to what may be termed a delivery or required point in auto-

matic or semi-automatic apparatus.

It is known to feed circlips in apparatus adapted to facilitate the delivery of circlips for use so as to speed up assembly and other operations. It will be appreciated the circlips must be delivered or removed individually.

The main object of this invention is to provide an easy method of, and means for, 115

supplying and mounting circlips.

Accordingly there is provided a method of positioning circlips in or as a magazine for supply to a delivery or receiving point, consisting in mounting a predetermined number of circlips on a carrier element, such as a bar, of a section complementary to the circlips at least to prevent their rotation, but allow freedom for sliding, providing temporary stop means to retain the clips on the element, and positioning the loaded element for gravity or other feeding of the circlips and their delivery or removal successively from or adjacent one end of the element as individual units.

The invention includes apparatus for the mounting of circlips, comprising a bar or equivalent element of a section substantially complementary to the circlips to prevent their rotation, and spring retaining clips to fit onto said element. The circlips may be substantially C-shaped with inner integral spring jaws extending inwardly from the inlet opening of each clip, or of open C-shape, U-shape, E-shape or the like.

In a particular embodiment of this invention, a mounting element is provided for the loading of circlips of a substantially C-shape with inner integral semi-circular spring jaws which extend inwardly from the inlet opening of the clip. The bar is made of keyhole cross-sectional shape so that the clips can be slid on from one end to be freely slidable thereon and held against rotation. For storage and transit and mounting purposes the circlips are held on the bar in any convenient manner such as by the provision of small spring clips which may be of corrugated wire formation. It will

be appreciated the bars may be made of any required length according to the number of circlips to be mounted thereon.

A clip loaded bar of the above type can readily be mounted in or on what may be termed supply apparatus and be held, say at one or both of its ends, so that the bar is in a vertical plane. With the bar so mounted the lower spring retaining clip can be removed from the pack of loose clips to fall into the desired position so that they can be removed successively by say a hand tool. Alternatively, the circlips are removed by separating or feeding means. The clips may fall by gravity or be removed as separate successive units. The said bar may be reduced at one end say to a rectangular cross section to enable the circlips to be removed radially and such end may fit into a location hole or means.

The invention provides a very easy method of, and means for, supplying circlips to a user and then easy mounting in feeding or supply apparatus in radially assembled relationship.

In a modification the carrier element is of Y-cross sectional shape, C-shape or other shape which alone, or in conjunction with other means, will prevent rotation but allow sliding of the circlips. Any of these elements may be solid or hollow and are arranged to present the circlips centrally.

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## COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

